

EXHIBIT 11

**DECLARATION OF LEIF PETERSON IN SUPPORT OF HUAWEI'S OPPOSITION TO
SAMSUNG'S MOTION TO PARTIALLY EXCLUDE AND STRIKE**

REDACTED VERSION OF DOCUMENT SOUGHT TO BE SEALED

Regarding the 3GPP Patent Landscape

1 Introduction and Overview

I am the same Charles Jackson that provided an opening report in this matter on April 27, 2018 (“Jackson Opening Report”).

This report (1) compares databases of patents that have been declared as essential to LTE with regard to their similarity, differences, and apparent errors and (2) responds to assertions made by Dr. Gregory Leonard in his expert report dated April 27, 2018 (“Leonard Opening Report”) regarding (1) the use of contributions analysis and (2) what he refers to as “true LTE” patents.

As to the first part of my assignment in this report, I compare (1) the Concur IP census and essentiality database (“the C&E database”) of worldwide patents that have been declared as essential to 3GPP standards, of which I oversaw the creation and described in my initial report,

[REDACTED]

(2) the essentiality check undertaken during creation of the C&E database, which required analysis of the patent claims, makes the C&E database a more reliable source for information about the parties’ respective SEP portfolios because in addition to making an essentiality assessment, it also, for example, screened out irrelevant patents [REDACTED]

[REDACTED] This screening or checking process, together with the fact that the Leonard patent lists appear to have to have been created without the use of a comparable screening mechanism, means that the counts of LTE families in the C&E database are highly likely to provide a better estimate of a firm’s LTE SEPs than is a simple count of the declared LTE families [REDACTED] In my opening report I reviewed several earlier landscaping studies and pointed out that several of them found that the ratio of essential patents to declared patents varied substantially among firms.¹ Essentiality analysis is the only way the

¹ For example, see Jackson Report at 40.

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variation in the ratio of actual-SEPs to declared-SEPs can be calculated and used to improve one's understanding of a firm's patent portfolio.

[REDACTED]

[REDACTED] As I discuss below, this ignores the significant—and critical—contributions and features that were added to the LTE standard in post-Release 8 versions of the standard.

2 Comparison of the C&E Database with Dr. Leonard's Patent Lists

In my initial report, I described a Census and Essentiality (C&E) database which was compiled under my direction and which contains information on more than 150,000 patents. In his initial expert report, Dr. Leonard states that he calculated various quantities such as Huawei's share of

[REDACTED]

methodology by which these lists were created is not described anywhere in Dr. Leonard's report (nor in any other Samsung expert's report to my knowledge).

² For example, see Exhibit 4b.. These spreadsheet files are named *Huawei Worldwide LTE Patent List.xlsx* and *US LTE Patent List.xlsx*

[REDACTED]
 [REDACTED]
 [REDACTED]
 [REDACTED]
 [REDACTED]
 [REDACTED]
 [REDACTED]

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Table 1. Comparing the Information about U.S. LTE Patents from the Two Sources

| Aspect | LeonardLTE_US | C&E (declared to LTE and issued) | Observations |
|---|---------------|----------------------------------|--|
| Number of families (all patents) | [REDACTED] | 8,463 | The family count for the C&E database considers only patent families that have been declared to LTE and that contain an issued family member. C&E also contains information on applications including applications in families that do not contain any issued [REDACTED] |
| Number of families (patents issued 2/21/17 or earlier) | [REDACTED] | 8,463 | The C&E database was prepared based on data available from ETSI on or before 1/1/17. The latest U.S. patent in the database is US9578635, which was issued 2/21/17. |
| Number of families with patents in both databases (LTE issued 2/21/17 or earlier) | [REDACTED] | 7,319 | [REDACTED] |
| Number of patents | [REDACTED] | 15,361 | |
| Number of patents issued 2/21/17 or earlier | [REDACTED] | 15,361 | |
| Number of patents issued 2/21/17 or earlier less withdrawn patents | [REDACTED] | 15,351 | [REDACTED] |

[REDACTED]

[REDACTED]

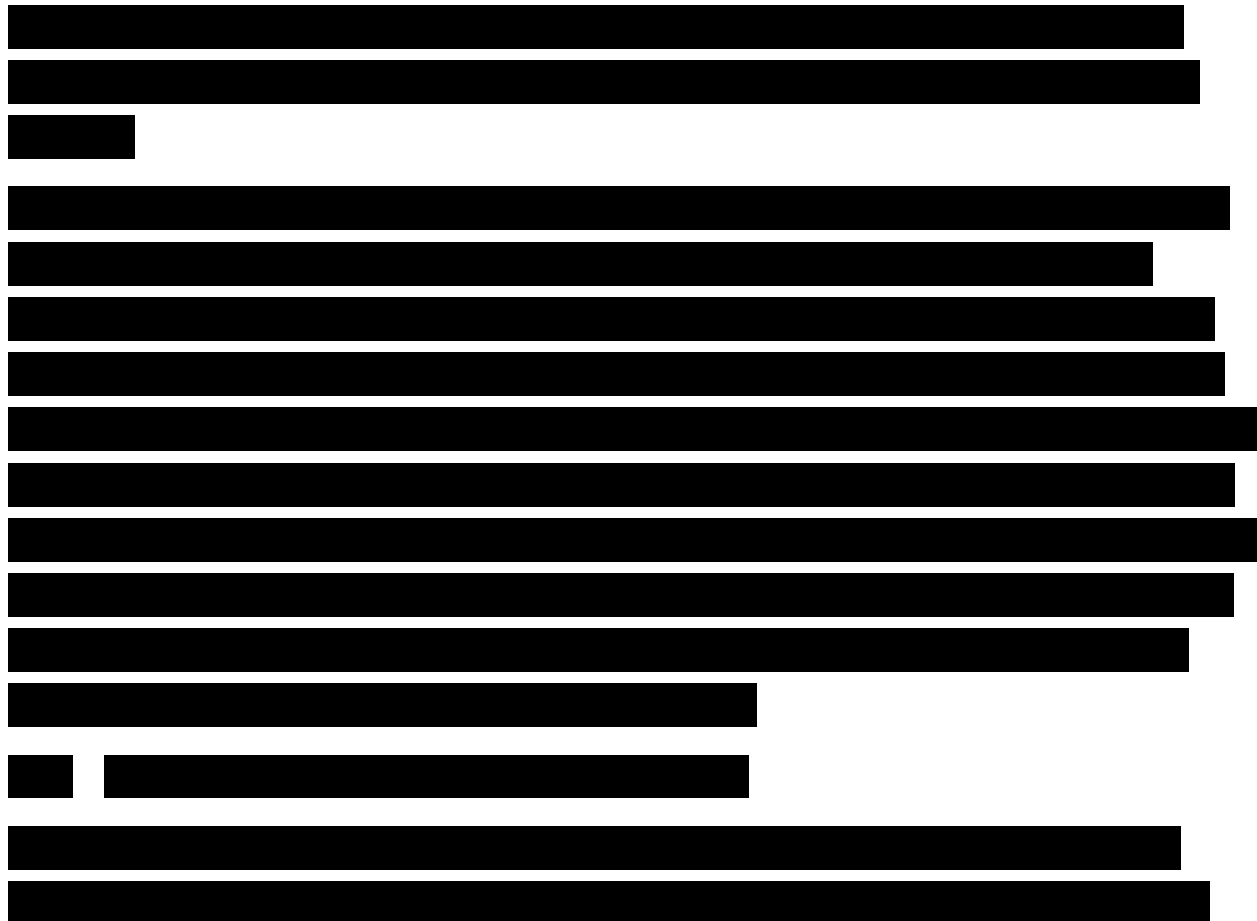
[REDACTED]

[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

8

This image consists of approximately 20 horizontal black bars of different lengths, stacked vertically. These bars represent redacted information from a document. The lengths vary significantly, with some bars spanning most of the width of the page and others being much shorter. There are no discernible patterns or structures other than the simple rectangular shapes used for redaction.

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[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

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[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

Figure 1. ETSI Search for US7436764

Figure 2. ETSI Report on Declarations for US7436764

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3GPP Portal

Specification #: 25.346

General Versions Responsibility Related

Reference: 25.346
 Title: Introduction of the Multimedia Broadcast/Multicast Service (MBMS) in the Radio Access Network (RAN); Stage 2
 Status: Under change control **CR**
 Type: Technical specification (TS)
 Initial planned Release: Release 6
 Internal: ☐
 Common IMS Specification: ☐
 Radio technology: ☐ 2G ☒ 3G ☐ LTE ☐ 5G

[Click to see all versions of this specification](#)

Remarks (1)

| Creation date | Author | Remark |
|----------------------|-----------------|-----------------------------|
| 2017-07-04 10:48 UTC | John M Meredith | Txferred from RAN2 to RAN6. |

History

| Action date | Action | Author |
|----------------------|-----------------------------|-----------------|
| 2017-07-04 10:54 UTC | Txferred from RAN2 to RAN6. | John M Meredith |

Figure 3. 3GPP Description of 25.346

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

⁸ Specifically, US7944947 is for a method for circumventing limitations created by the use of Network Address Translation (NAT) devices.

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The screenshot displays the Espacenet Patent search website. The header includes the European Patent Office logo and the text 'Espacenet Patent search'. Navigation links for 'Deutsch', 'English', and 'Français' are present, along with a 'Contact' link and a 'Change country' dropdown. A secondary navigation bar contains links for 'About Espacenet' and 'Other EPO online services'. Below this is a search bar and a list of tabs: 'Search', 'Result list', 'My patents list (0)', 'Query history', 'Settings', and 'Help'. The main content area shows the 'Family list: US9374709 (B2) — 2016-06-21'. On the left, a sidebar lists various document types: 'US9374709 (B2)', 'Bibliographic data', 'Description', 'Claims', 'Mosaics', 'Original document', 'Cited documents', 'Citing documents', 'INPADOC legal status', and 'INPADOC patent family'. The main list shows '1 application(s) for: US9374709 (B2)'. Below this, a table provides details for the patent family:


| 1. METHODS AND SYSTEMS FOR BASE STATION DETECTION | | CPC: | IPC: | Publication info: | Priority date: |
|---|---------------------------|-----------|-----------|-------------------|----------------|
| ★ Inventor: | Applicant: | H04L67/12 | H04W12/08 | US2014213216 (A1) | 2013-01-29 |
| PEIRCE KENNETH L [US] | GEN MOTORS LLC [US] | H04W12/08 | | 2014-07-31 | |
| SCHEIM KOBI | GM GLOBAL TECH OPERATIONS | H04W12/12 | | US9374709 (B2) | |
| JACOB [IL] | INC [US] | (+1) | | 2016-06-21 | |

At the bottom left, there is a 'Quick help' section with links: '→ Can I export this list?' and '→ What happens if I click on "Download covers?"'. A 'Global Dossier' link is also visible at the bottom right of the table.

Figure 4. Espacenet Family for US9374709

⁹ The patent requires the UE to send information back to the base station that causes the base station to reduce transmission power. In UMTS and LTE the signals sent by the base station are received by many UEs at the same time. If the base station reduced power, UE on the edge of the cell's coverage area would lose service.

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ETSI IPR Online Database 


Dynamic reporting

| ETSI Projects | Standards | Companies |
|---------------|-----------|-----------|
| 421 | 10262 | 267 |

Search declaration

Reference

Declaring companies
 Gemplus SA
 General Dynamics UK Limited
 GIESECKE & DEVRIENT Gmb
 Golden Bridge Technology Inc.
 Grundig E.M.V.

Work item no. / Standard no. / Specification no. [Add](#) 

Type



Declaration date from 

Figure 5. List of Declaring Companies in ETSI Database Showing General Motors is not Listed

Search Patents - Google Chrome

Secure | <https://ipr.etsi.org/SelectPatentLocal.aspx?uniqueId=ucPatent>

SELECT LOCAL PATENTS 

Select local patent

Application Number

Publication number

Patent title

Patent holder company(ies) [Add](#)

Country of registration ☒

Patent office organisation ☐

| Application number | Publication number | Title | Holder companies |
|------------------------|--------------------|-------|------------------|
| No records to display. | | | |
| 1 | | | |

Figure 6. Search for US9374709 in ETSI Database

10 The disclosure appears to me to contain CN200480043975.

A series of horizontal black bars of varying lengths, representing redacted text. The bars are arranged in a list-like fashion, with some bars being significantly longer than others, suggesting a list of items where the details have been obscured. The bars are solid black and have no text or other markings on them.

¹² *Id.* at ¶ 169.

By contrast, the C&E database offered by Huawei in this case permits auditing of the ETSI-declaration information. Specifically, the record for each family contains a field indicating whether the patent was declared to ETSI and another field showing to which standards and publications it is declared to be essential. If one wishes to check the declaration status of a particular patent, one can retrieve all members of the patent family and see which members are shown as declared. [REDACTED]

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2.2 Similar Analysis of the C&E Database

2.2.1 Analysis of Withdrawn Patents

I also used the list of withdrawn patents (discussed above with respect to my analysis of the Leonard patent lists) to search the C&E database for withdrawn U.S. patents. I found 10 such patents in the C&E database's initial universe of reviewed patents. Of those 10, 8 were also [REDACTED] One of the 10 was excluded during the C&E database's essentiality analysis because it lacked an INPADOC family ID.¹⁴ Further, three of the 10 had "withdrawn" noted in the claim analysis. Another one of the withdrawn patents was characterized as "not relevant." Thus, 5 of the 10 were excluded from essentiality analysis altogether. Moreover, none of the 10 were identified as containing claims found to be essential. Therefore, the presence of these patents in the C&E database's initial set of patents did not affect the identification or final reporting of deemed SEPs or SEP families that resulted from the final C&E database.

2.2.2 Analysis of Other Patents

As I did in analyzing LeonardLTE_US, I have analyzed a sampling of those patents which appear in Dr. Leonard's patent list but do not appear in the U.S. C&E database (or vice versa) or show other peculiarities. I discuss those patents below.

2.2.2.1 US8483166

Patent US8483166 does not appear in the U.S. C&E database [REDACTED]

[REDACTED] The Chinese member of the family containing US8483166 was declared by Huawei (the patent owner) on March 4, 2009. I downloaded the PDF file containing the declaration from the ETSI website. The declaration submitted to ETSI has the Chinese patent number indicated in faint print. Figure 7 shows the relevant portion of that declaration. An enlarged image of the application number has been inserted into that figure. I used the text

¹⁴ A search of Espacenet for this withdrawn patent returns nothing. Because the patent is withdrawn, Espacenet does not supply an INPADOC family ID.

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recognition process in Adobe Acrobat to create a text version of the image. The patent number was rendered as “20071 016606 6. R,” which is not correct. If ETSI had used a text recognition engine with comparable performance, it would not have entered the correct patent number into its database.

| Page 30 ETSI Rules of Procedure, 26 November 2008 | | | | | | |
|--|------|----|------|----|---------------------|----------------|
| UMTS | 3GPP | TS | 23.4 | 01 | Huawei Technologies | 20071016606.8 |
| UMTS | 3GPP | TS | | | Huawei Technologies | 200710169584.5 |

Figure 7. Image of Declaration to ETSI (Annotation Added)

There is a second possible complication. Looking at the image in Figure 7, the application number appears to be 200710166066. I searched Espacenet for CN200710166066, but the search found nothing.¹⁵ I also searched for CN20071166066 (I removed the zero between the two ones), and I found the Chinese member of the family containing US8483116. Espacenet displays a priority number as “CN20071166066 20071101.” As of May 2018, the ETSI database reports that family CN20071166066 is declared. But if at the time Concur IP downloaded the ETSI database, that family identifier was incorrect (due to, for example, either a scanning problem or some other issue) this family would not have been properly identified. However, because the patent is owned by Huawei, this error in the U.S. C&E database improperly reduces Huawei’s count of declared SEPs.¹⁶ In other words, correcting the error will increase Huawei’s count of declared SEPs and potentially increase Huawei’s count of essential SEPs as well.

¹⁵ Espacenet requires the CN prefix to identify the jurisdiction.

¹⁶ Although this error in the database was detected before my initial report was prepared, the error was not corrected thereby ensuring that Concur IP prepared the database using the predefined process and protocol, and treated patents from all companies equally to ensure neutrality and objectivity. Concur IP had not been informed that Huawei was the underlying sponsor of the project.

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2.2.2.2 US9136956

The C&E database includes US9136956B2 in its family 10033 (one of the largest families, with 222 US LTE patents). Unwired Planet is shown as the assignee. Google Patents shows Comcast Cable Holdings LLC as the assignee. Espacenet shows US9136956B2 in a family with 410 members and several different assignees including Broadcom, Comcast, and Norand. This patent was mistakenly included in the C&E database for two reasons. First, ETSI specifies patent families using INPADOC families. INPADOC families are based on shared priority dates and inventor names.¹⁷ In some cases, coincidence of names and dates may result in unrelated patents being classified in the same patent family. Espacenet corrects INPADOC family IDs when such errors are reported.¹⁸ Such corrections make it hard to go back and identify the source of such mistaken families. However, the inclusion of this patent in C&E has no effect on an analysis based on patent family counts, because the inclusion does not increase or decrease any family counts. I understand that Mr. Lasinski's analysis, for example, relied on deemed patent families, not individual patents; therefore, this error would have had no impact on his analysis.

2.2.2.3 US9131524

The U.S. C&E database shows US9131524B2 to be assigned to Anchor Orthopedics. Google Patents shows it to be assigned to Qualcomm Inc. This error in the assignee has no impact on any analysis of Huawei's or Samsung's portfolios, because (although the assignment information was incorrect) the patent would have been counted in the total number of families declared.

2.2.3 *Concluding Thoughts*

These above examples are merely meant to illustrate the type of errors that I was able to identify in the C&E database. As one can see from the discussion above, in large part such errors have had minimal—if any—impact on the results of the C&E database study, or how I understand those results have been utilized by Mr. Lasinski in this litigation. As can be seen, like

¹⁷ See https://worldwide.espacenet.com/help?locale=en_EP&method=handleHelpTopic&topic=patentfamily

¹⁸ The Espacenet document correction process is described at https://forms.epo.org/searching-for-patents/technical/espacenet/error-form.html?01_hi_InterfaceCode=EP&02_hi_ViewPane=Biblio&03_hi_DebugData=test&10_ri_DocumentNo=US2015203075A1

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there were some identifiable errors in the U.S. C&E database, such as the inclusion of some withdrawn patents. However, my review of both sets of data indicates that the

This is likely a result of the essentiality analysis component of the C&E database, which eliminates many, in fact —probably the vast majority— of these errors.

2.3 Comparison of the Leonard_H_W list and the C&E Database

I also examined Dr. Leonard's second list—Leonard_H_W—to understand the types and magnitude of errors that are present. As I summarize below, Dr. Leonard's second list contained

Table 2. Comparing Information about Worldwide Huawei Patents from the Two Sources

| Aspect | Leonard_H_W | C&E (declared to LTE and issued in nine jurisdictions) | Observations |
|---|-------------|--|--|
| Number of patents | | 3,085 | C&E database considers only patent families that have been declared to LTE and that contain an issued family member. |
| Patents common to both and alive on 1/1/17 in C&E, assigned to Huawei, and declared to LTE in C&E | | 1,821 | |

[REDACTED]

Figure 8. 3GPP Description of 25.346

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3 “True” LTE Patents

[REDACTED]

[REDACTED]

[REDACTED]

It is true that a feature that is essential to Release 8 compliant equipment is also highly likely to be essential to Release 12 compliant equipment given the typical requirement of backward compatibility. Though it is possible such features exist, I am not aware of any features that have been dropped from the LTE standard over the progression from Release 8 to Release 12.²³

On the other hand, Release 9 included features that are indispensable for voice calls—for example, the ability to call 911 and location capabilities such as GPS (needed to meet the Federal Communication Commission’s [FCC] legal requirements for E911 service). These Release 9 features are necessary in any device that is used for voice calls.²⁴ Given these regulatory requirements, the related Release 9 features are as much “core features” or “true LTE” as are

²¹ See Leonard at ¶ 105 and footnote 142.

²² Ibid

²³ However, I am aware of features removed from UMTS and of features that are now rarely used.

²⁴ See <https://www.fcc.gov/general/9-1-1-and-e9-1-1-services> for an overview of the relevant FCC rules. Those rules are set forth at 47 CFR 20.18 (911 Service).

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Before beginning that detailed analysis, let me provide some context. In my opening report, I discussed the use of contributions—more correctly, of “approved contributions”—as a tool for understanding the strength of a firm’s SEP portfolio. I characterized the 3GPP standards development process as “the collaborative design of the key elements of advanced wireless systems by the joint efforts of the world’s large telecommunications equipment design and manufacturing firms.”⁴⁸ This is not just my view of the process. A March 2018 press release from Samsung described the process similarly saying,

The 3GPP is a collaborative project aimed at developing global standards for acceptable specifications of telecommunications networks.⁴⁹

Approved contributions are the building blocks that are assembled to create the overall design of the 3GPP standards. They are, figuratively speaking, blueprints for the wireless system.

Baron and Gupta describe this process saying,

Technical contributions are the unique technical solutions to problems the technical challenges that an SSO faces. Many of these solutions are patented, as an outcome of the R&D that led to these potential solutions.⁵⁰

Each 3GPP standard is a compilation of approved contributions. Creating a contribution that becomes approved often involves designing a new capability or solving a previously unsolved problem. Such designs and solutions may also be patentable inventions. A Nokia patent illustrates this process. Nokia presented to TSG-RAN WG2 a proposed solution to a problem in packet data communication that had been identified earlier.⁵¹ Figure 10 reproduces Figure 2 from that contribution. The minutes of that meeting show that the contribution was presented by Benoist Sebire from Nokia.⁵²

⁴⁸ Ibid at 87.

⁴⁹ *Samsung Research Director Elected as New Chairman of 3GPP Working Group*, (Samsung Press Release, March 22, 2018), at 2. Retrieved from <https://news.samsung.com/global/samsung-research-institute-director-mr-suresh-chitturi-elected-as-new-chairman-of-3gpp-sa6-working-group>

⁵⁰ Baron, J., & Gupta, K. (2018). Unpacking 3GPP standards. *Journal of Economics and Management Strategy*. Advance online publication. (HW_Samsung_00864590 – HW_Samsung_00864642) at 39. Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3119112

⁵¹ R2-060335. *Continuous Connectivity Impact to MAC*, 3GPP TSG-RAN WG2 Meeting #51 (February 13-17, 2006).

⁵² Draft Minutes RAN2-51, at p. 58. Retrieved from http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_51/Report/

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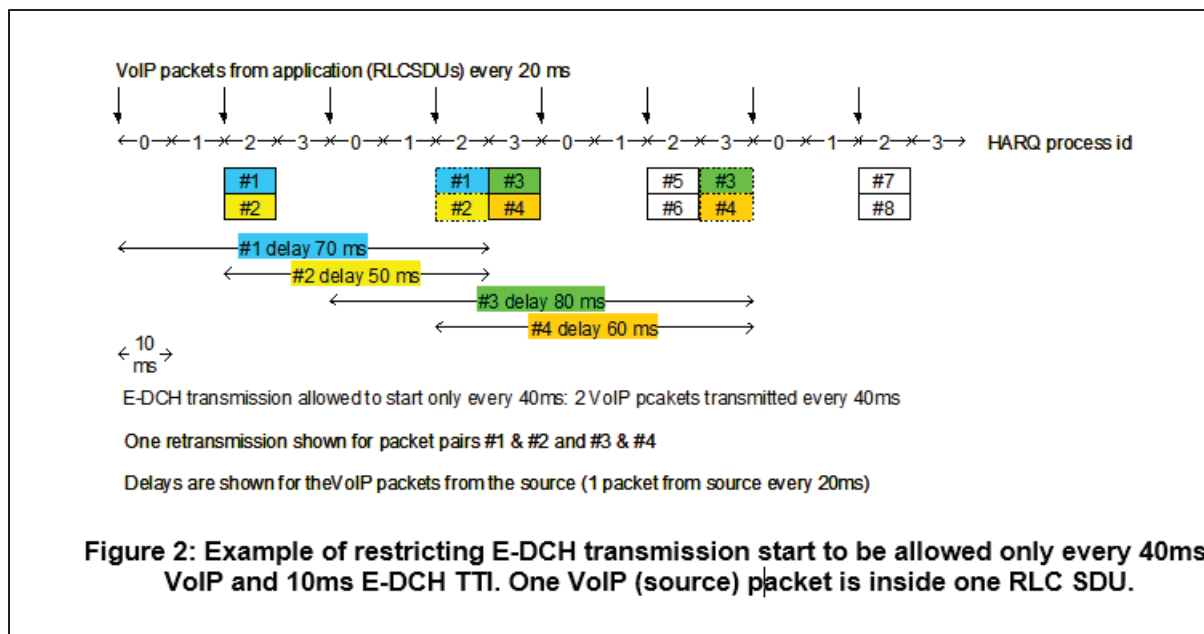


Figure 10. Figure 2 from Nokia Contribution to 3GPP TSG-RAN WG2

A few months earlier, five Nokia engineers had filed a patent application for the invention described in the contribution. Figure 11 shows Figure 5 in the U.S. patent that resulted from that application. Notice that this figure is almost identical to the figure in the contribution. The first named inventor on the patent is Benoist Sebire—the Nokia engineer who presented the contribution at the working group meeting.

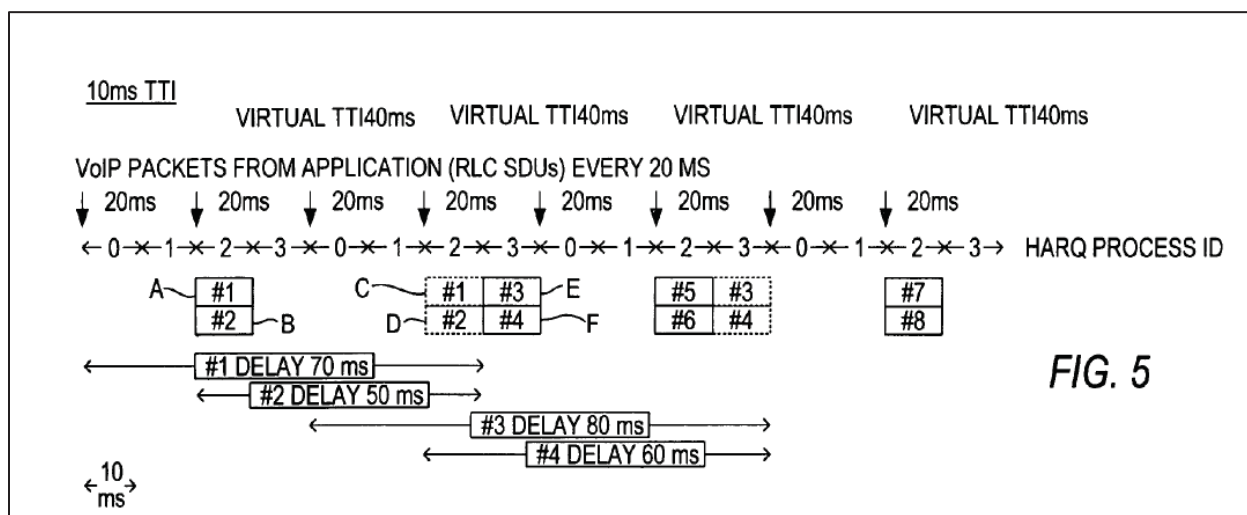


Figure 11. Figure 5 from U.S. 7,804,850

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In this case the contribution was “noted” rather than accepted. But, the concept stayed alive in the 3GPP process and was ultimately incorporated into the standard.⁵³

I now turn to Dr. Leonard’s specific criticisms of contribution analysis.

4.1 [REDACTED]

This is an obfuscating observation. Accepted contributions are a measure of the research and development effort directly related to the standard. Moreover, in many cases, accepted contributions have been assessed by qualified peers as appropriate for incorporation into the standard. A count of accepted contributions is not a direct measure of value. However, approved contributions are strong indicators regarding a firm’s investment in relevant and successful R&D and its creation of useful design features that have made it into the standard.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

⁵³ Other examples of contributions and corresponding patents are given by U.S Patent 9,843,996 and 3GPP Tdoc R2-133440 and U.S Patent 8,112,093 and 3GPP Tdoc R2-051203.

⁵⁴ [REDACTED]

⁵⁵ [REDACTED]

⁵⁶ The Signals Research database (HW_Samsung_00681608) shows Huawei with 7,670 approved contributions and Samsung with 1,593. (Tab: All_APV at C3 and C9). $7,760/1,593 = 4.8$.

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4.2 [REDACTED]

There is an old saying, "Absence of evidence is not evidence of absence." The view that there is a link between the number of contributions a firm has made to a standard and the number of SEPs the firm holds is a common-sense view.

A statement in the Taiwan Year 103 Report also provides support for that view:

However, for most manufacturers, their number of major standards proposals has a clear relevance with their number of SEPs (relevance scores as high as 0.52). For example, Broadcom, Samsung, Nokia, Ericsson, and Huawei are all manufacturers with high proposal and SEP counts.⁵⁸

There are some closely related empirical results that confirm the linkage. Kang and Kazuyuki analyzed the relationship between declared SEPs and several factors. One factor they considered was an inventor's involvement in the standardization process. They concluded:

The regression analysis proved that inventors' involvement in the standardization process as meeting attendees is the most important factor in obtaining essential IPRs.⁵⁹

Approved contributions are a measure of the value, as judged by informed peers, of the output of from the R&D that led to both contributions and related patents. The Kang and Bekkers paper

⁵⁷ [REDACTED]

⁵⁸ See Year 103 Communications Industry Patent Trends and Patent Litigation Analysis Research, National Applied Research Laboratories Report, 2014 at p. 125.

⁵⁹ Kang, B., & Kazuyuki, M. (2012). *Determinants of essential intellectual property rights for wireless communications standards: Manufacturing firms vs. non-manufacturing patentees* (RIETI Discussion Paper Series 12-E-042), at p. 37. Retrieved from <https://www.rieti.go.jp/en/publications/summary/12060011.html>

4.3

In 3GPP, the vast majority of contributions are approved by consensus. If a vote is required, a supermajority, 71% or more, is needed for the contribution to be accepted. It may be that in some standards development organizations, favoritism and logrolling are important components of the process, but evidence shows that 3GPP is not such an organization. Samsung's inventor

⁶² Ibid at 196:18-25.

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[REDACTED]

In about 2008, 3GPP adopted a new policy, one designed to permit progress when a minority objects to a proposed course of action.⁶⁴ Under that new policy, 3GPP allows a chairman to make a tentative decision on an issue when a consensus cannot be reached. Such tentative agreements are called *working agreements*. Working agreements are posted on the 3GPP website and can be challenged by parties who object to the working agreement. Such objections are resolved by a vote requiring a 71% majority. Each individual member (firm) gets one vote, so a firm cannot shift a vote in its favor by sending many representatives to a meeting.⁶⁵ The 3GPP website lists only 22 working agreements that have been created between October 2008 and March 2018.⁶⁶ Most of these were unchallenged; only two of them were put to a vote, and both of those were confirmed. Twenty-two is a tiny fraction of the tens of thousands of contributions that were approved between October 2008 and March 2018.⁶⁷ Clearly, the vast majority of 3GPP decisions are made by consensus.

Given a choice between two alternative proposals for a specific design problem, most participants have strong incentives to favor the better-performing alternative. Service providers such as AT&T and Verizon benefit from systems that deliver more valuable features and cost

⁶³ Ibid at 206:20-207:2. See also Deposition transcript of Gert-Jans Van Lieshout Tr., December 12, 2017, *Huawei Technologies Co., Ltd., et al. v. Samsung Electronics Co., Ltd.* [REDACTED]

⁶⁴ See 3GPP Global Initiative – *TSG Working Agreements*. Retrieved from <http://www.3gpp.org/specifications-groups/32-tsg-working-agreements>

⁶⁵ See Article 26: TSG and WG voting during a meeting and Article 27: TSG or WG voting by correspondence. Retrieved from http://www.3gpp.org/ftp/Information/Working_Procedures/3GPP_WP.htm#Article_26. Note that a single firm may have multiple subsidiaries that are individual members. For example, 15 Samsung entities (e.g., Beijing Samsung Telecom R&D) and 10 Huawei entities (e.g., Huawei Technologies France) were eligible to vote in TSG CT WG 1 meeting #111. A total of 178 members had the right to vote. See Voting list for TSG CT WG 1 meeting #111. Retrieved from http://www.3gpp.org/ftp/webExtensions/elections/CT/CT1/Election_May_2018/votingList_CT1_mtg-111.htm.

⁶⁶ <http://www.3gpp.org/specifications-groups/working-agreements>

⁶⁷ The Signals Research Database (HW_Samsung_00681608) shows 39,906 contributions approved in 2009-2016. (Tab: All_APV, AI310:AP310).

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less. Manufacturers such as Apple and LG benefit if wireless systems deliver more value to consumers—thereby making cell phones more valuable.⁶⁸

Empirical support for the proposition that large firms are not favored in the 3GPP process is given by Gupta.⁶⁹ Gupta found that 15% of the participants in the 3GPP process are either startups or small-to-medium sized entities (SMEs).⁷⁰ She also found that 34% of contributions by startups and SMEs were accepted. This rate contrasts favorably with the 29% rate for other contributors and the 30% rate for the top 10 contributors.⁷¹ This is strong evidence that manipulation of the process (e.g., logrolling) by the largest contributors is unlikely to be a significant factor in 3GPP. Startups and SMEs have little to offer others in return for getting those others to support their proposals.

Gupta also stated,

It is straight forward to assume that these contributions form the basis of the underlying Intellectual Property (IP) that then becomes potentially essential to the implementation of the standard (or the patents referred to as Standard Essential Patents (SEPs)).⁷²

and

Put simply, technology contributions to standards are often patented.⁷³

Elsewhere, Gupta and her coauthor Baron also stated,

An aspect of standardization that has motivated an important and growing body of economic analysis is the fact that some standards can only be implemented using patented technologies. Data on SEPs, discussed in detail in a related article (Baron and Pohlmann, 2018), can be related to technical contributions, which are covered by the data described in this paper. Technical contributions are the unique technical solutions to problems the technical challenges that an SSO faces. Many of these

⁶⁸ Some participants, such as test equipment manufacturers, appear to me to have little corporate incentive to favor superior alternatives. Still, engineering norms of efficiency and quality would often result in such firms supporting the superior alternative.

⁶⁹ Gupta, K. (2017). *The role of SMEs and startups in standards development*. Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3001513

⁷⁰ Ibid at p. 5.

⁷¹ Ibid at p. 7.

⁷² Ibid at p. 6.

⁷³ Ibid at p. 9. Dr. Gupta is an economist. Earlier in her career, she was a wireless engineer and participated in 3GPP.

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solutions are patented, as an outcome of the R&D that led to these potential solutions.⁷⁴

It may be that in some standards development organizations, favoritism and logrolling are important components of the process. However, given (1) the strong emphasis on consensus, (2) the large number of voting entities, and (3) the one-firm, one-vote rule together with the empirical evidence that contributions from startups and SMEs are accepted as readily as contributions from the largest firms, it appears unlikely that such favoritism is a major factor in the approval of contributions within the 3GPP working groups that are relevant to this litigation. Rather, it appears that technical merit, as judged by informed peers in the industry, is the key factor in the approval of contributions. Such technical merit is related to the value of the ideas, including any patentable inventions, in the contribution, because the contribution has solved a problem or advanced the state of the art, to help meet 3GPP's ambitious goals for development of the standard as a whole.⁷⁵

_____ he cites a paper by Kang and Bekkers. However, his assertion misstates their conclusion. Kang and Bekkers conclude that a subset of SEPs—those patents applied for in the week before a meeting of a standards working group in which the inventor participated—are less valuable than other SEPs. I did not find in that paper any discussion of the fraction of all SEPs that are such “just-in-time” patents.⁷⁷ However, the information in that paper's Table 2 allows one to calculate that fraction. A total of 1,856 SEPs were considered. Of these, 326 (18%) were applied for in the week before a meeting at which the inventor was present. Assuming, for purposes of argument, that Kang and Bekkers's conclusion is correct, then about one-fifth of SEPs fall into this category of less-

⁷⁴ Baron, J., & Gupta, K. (2018). Unpacking 3GPP standards. *Journal of Economics and Management Strategy*. Advance online publication. (HW_Samsung_00864590 – HW_Samsung_00864642) at 39. Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3119112

⁷⁵ For example, Peak data rates have increased from about one megabit per second 15 years ago to a thousand times that—one gigabit per second—today.

⁷⁶ Leonard Opening Report at ¶ 185.

⁷⁷ Dr. Leonard does not provide any opinion or data suggesting that Huawei or Samsung follows such a practice.

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valuable SEPs.⁷⁸ However, there is an offsetting fact. Their Figure 3 shows that the value criterion they use—relative citation count—is higher for participant-inventors than for non-participant-inventors.⁷⁹ Their fundamental conclusion could be restated as follows: “Patents applied for by meeting participants in the week before a working-group meeting are better, on average, than those applied for by nonparticipants at any time but not as good as those applied for by meeting participants at other times.” That is, Kang and Bekkers show that patents applied for by meeting participants more than a week before a meeting are the most valuable SEPs, the subset of patents applied for by meeting participants in the week before a working-group meeting are second most valuable, and those applied for by participants during the meeting come in third; patents by non-contributors trail all categories of patents by participants. Table 2 of Kang and Bekkers also shows that only one-third of the SEP patents applied for by meeting participants are applied for during the week before a meeting.

Careful reading of Kang and Bekkers’s paper supports the view that contributions measure a firm’s input of valuable ideas and inventions into a 3GPP standard, and that a company’s involvement in the standardization process results on average [REDACTED]

4.4 [REDACTED]

Of course, the above assertion is true as a general matter. But, it does not address the main point—that contributions are a reasonable measure of a firm’s investment of time and money into the design process that creates 3GPP standards, and which will likely result in patented technologies.

[REDACTED] But in my view this is special case that does not represent the actual processes at 3GPP. The early

⁷⁸ There is substantial reason to doubt that Kang and Bekkers’s conclusion is particularly robust or that it applies to Huawei.

⁷⁹ This is true for all time periods. Participant-inventors at their worst (the week before a meeting) are better than others at their best.

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development of the WCDMA 3G standard took place in ETSI before the formation of 3GPP. Participation was limited to European firms. It would not be unfair to describe the early evolution of the WCDMA standard at ETSI as an attempt to design a CDMA system that worked around Qualcomm's patents.

Bekkers characterizes the dispute over the standard saying,

December 10, 1998: Qualcomm rejects the proposal of Ericsson to lower the chip rate of WCDMA to 3.84 Mchip/s and demands that the WCDMA chip rate be brought down further to 3.6864 Mchip/s (the chip rate of cdma2000). It claims that technically the UMTS standard is not very different from the cdma2000 standard, but that the parameters are intentionally chosen in such a way that it is incompatible with the cdmaOne and cdma2000 standards. The CDMA Development Group (CDG) rejects Ericsson's proposal too, stating again that a chip rate has been chosen that is purposely incompatible with cdma2000.⁸⁰

Mock describes Qualcomm's attempt to participate at ETSI as follows:

With parallel efforts to develop next generation code-based wireless standards going on in different regions of the world, Qualcomm attempted to participate in some of the European meetings coordinated through the European Telecommunications Standards Institute (ETSI). But Qualcomm quickly found it rather difficult to participate to any meaningful degree, as ETSI stipulated that only European companies could participate. To get around this exclusion, Qualcomm opened a European subsidiary with the expressed purpose of having a voice in the technology it pioneered and knew so much about. But the voice was a very small one—European revenue determined the number of votes a participant in ETSI was allowed. Since GSM dominated the EU, Qualcomm's European revenue was effectively zero. Having only one vote, Qualcomm held no power compared with other companies such as Ericsson, which had more than sixty-five votes⁸¹

Thus, Qualcomm's problem arose from the fact that European industry then wanted to exclude Qualcomm from the standards development process and, as much as possible, from the global market for 3G wireless. This exclusion was supported by European governments. In December 1998, Secretary of State Madeleine Albright, U.S. Trade Representative Charlene Barshefsky, Secretary of Commerce William Daley, and FCC Chairman William Kennard sent a letter to

⁸⁰ Beckers, R. (2001). *Mobile telecommunications standards GSM, UMTS, TETRA, and ERMES*. Norwood, MA: Artech House, at p. 579.

⁸¹ Mock, D. (2005). *The Qualcomm Equation: How a fledgling telecom company forged a new path to big profits and market dominance*. New York, NY: AMACOM, at pp. 203–204.

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European Commission Commissioner Martin Bangemann expressing concern that there was an attempt in Europe to promote a particular European-developed 3G standard to the exclusion of other technologies.⁸² The fact that senior officials of the federal government sent such a letter shows how important this trade dispute had become.

The European attempt to engineer around the Qualcomm patents failed. Despite the efforts at ETSI to work around them, those patents were WCDMA SEPs. Were Qualcomm allowed to more fully participate in the standardization, its patents likely would have been declared to the standard via corresponding contributions. Therefore, the case of Qualcomm and ETSI/WCDMA is unique; it does not weaken the proposition that contributions to 3GPP in recent years, related to LTE, are a reasonable measure of the relevance of a firm's patent portfolio to 3GPP standards including LTE. Indeed, the standards development process in 3GPP is and has been since 3GPP's inception designed to avoid the problems that Qualcomm encountered 20 years ago under the then-governing procedures at ETSI.⁸³

4.5 [REDACTED]

Asserting that a source of information about a portfolio index is flawed because it is not tied to specific elements of the portfolio is like asserting that judging the quality of a college basketball team by whether it plays in the NCAA tournament is flawed because it is not tied to specific players on the team. Dr. Leonard's assertion is not logical.

[REDACTED]

[REDACTED]

Of course, it is true that some contributions are minor—a contribution may consist of a variety of small changes to a standard. But, other contributions describe fundamental design concepts that

⁸² See U.S. Department of State, Office of the Spokesman, Press Statement, *United States Presses Europe To Adopt Fair Standards For Wireless Communications*, December 22, 1998.

⁸³ 3GPP came in to being in December 1998 and took over the development of a 3G standard from ETSI. The 3GPP process is open to participants from around the globe. 3GPP rules try to ensure corporate and geographic diversity in the leadership of 3GPP.

⁸⁴ Leonard Opening Report at ¶ 187.

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are incorporated into the standard. There is no reason to think that the proportion of Huawei's contributions that are minor differs from the proportion for other firms. One of the strongest pieces of evidence supporting the value of contributions is the fact that the 3GPP standards exist. Those standards are the combined result of tens of thousands of contributions and thousands of new technologies (many patented) and design elements which were incorporated into the standard via contributions.

[REDACTED] the 2010 Signals Research report, does not refer to change requests or CRs. It does refer to "editorial contributions." The Signals Research database, which was prepared some years later than that report, categorizes "Editorial Documents" in the "Non-Relevant Category" along with Administrative, Withdrawn, Rejected, and several other types of documents.⁸⁶ Thus, the count of approved contributions in the Signals Research database excludes contributions that are merely editorial in nature, which sufficiently addresses Dr. Leonard's criticism.

Dr. Leonard's characterization of CRs as edits to previous contributions is also incorrect. 3GPP describes CRs on their website.⁸⁷ That description begins with a summary,

The Change Request (CR) procedure is used by 3GPP to create revised versions of 3GPP specifications after their initial approval. The three main reasons why a change might be required are to:

- Add a new feature⁸⁸
- Correct / clarify / enhance an existing feature of a Release still under development
- Correct an error in a spec which is functionally frozen⁸⁹

⁸⁵ Leonard Report at ¶ 187.

⁸⁶ Signals Research Database (HW_Samsung_00681608) (Tab: Info at lines 59–69).

⁸⁷ See <http://www.3gpp.org/specifications/change-requests>, 3GPP TR 21.900.

⁸⁸ The Samsung patent cited below as an example of a patent that can be identified with specific contribution was contributed by Samsung in a CR.

⁸⁹ <http://www.3gpp.org/specifications/change-requests>, at 1.

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The first reason given for creating a CR is “add a new feature” and the second reason includes “enhance an existing feature.” CRs modify standards that have been approved; they are not editorial changes to other contributions, as Dr. Leonard suggests.⁹⁰ CRs can be tied to patents. For instance, in a litigation against Apple, Samsung asserted a patent that it stated was based on a change request submitted to 3GPP.⁹¹

I understand that it is typical that the initial source of a contribution is the firm listed first if firms jointly sponsor a contribution. Signals Research informed us that the contribution count in their database is based on the first firm listed. Thus, Dr. Leonard’s criticism does not appear likely to have a significant impact.

Characterizing the use of contributions analysis as “flawed” rather than as “one factor to consider in assessing the value of a patent portfolio” is misleading. The reality is that the number of accepted contributions provides useful information regarding the likely value of a firm’s portfolio of SEPs.

points to two specific flaws with contribution analysis: (1) the fact that the number of contributions remains unchanged even if a firm sells much of its patent portfolio and (2) contribution counting would allow demanding royalties after patents had expired.

Note that these appear to be objections to the use of contribution analysis alone as the basis for valuing a portfolio. The first objection can be overcome by taking transferred patents into account, and the second can be overcome by taking expired patents into account.⁹³ Or,

⁹⁰ A standard is supposed to be at least 80% complete before it can be approved. See <http://www.3gpp.org/specifications/releases/20-specifications>.

⁹¹ See May 16, 2014 Samsung v. Apple Japanese court judgment at p. 119-20, Section (B) “Background of the FRAND Declaration,” parts a. and b (HW_Samsung_00860290 – HW_Samsung_00860441).

⁹² Leonard Opening Report at ¶ 188.

⁹³ It seems unlikely that there are many expired 3GPP SEPs in Huawei’s portfolio. A large majority of Huawei contributions were made in 2006 or later. If a relevant patent has a priority date close to the time that a corresponding contribution were made, it will be several years before it reaches the end of their lifetime.

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alternatively, contributions can be used merely as a means to appropriately weigh the significance of other portfolio assessment metrics—such as deemed essential patent counts—as I understand Mr. Lasinski does in his opening report in this matter.

4.6 Concluding Thoughts on Contributions

[REDACTED] endorses the use of contribution analysis to assess the strength of a firm's portfolio of SEP patents. The report he quotes also states,

Two things are certain. First, unlike patent-counting exercises which rely upon a company's self-proclamations to determine how many essential patents it has, this approach relies on an independent source – the 3GPP working groups – to determine what has and what has not been incorporated into the LTE standard and who should get credit for the contribution. Second, this approach doesn't include predictions of which documents (e.g., patent declarations) actually get approved and published. Instead, it only counts documents (e.g., approved 3GPP submissions) after they have been approved by a company's peers.⁹⁵

[REDACTED] in my view the failure to consider contributions analysis throws away useful information. As is recognized in the sources I have discussed above, as well as in my opening report, contributions analysis is a tool that can be used, along with others tools, to better understand the value of a patent portfolio.

⁹⁴ Leonard Opening Report at ¶ 183, footnote omitted.

⁹⁵ "The Essentials of Intellectual Property—Quantifying Technology Leadership in the Development of the LTE Standard," Signals Research Group, white paper paid and developed for Ericsson, September 2010, at 24. https://www.ericsson.com/mx/res/docs/2010/101220_lte_contribution_whitepaper.pdf.

5 Conclusions

Above, I address three issues from Dr. Leonard's report. First, I examined Dr. Leonard's list of U.S. LTE patents and showed that it [REDACTED]

[REDACTED] I also observed that the essentiality analysis performed to create the C&E database considered only patents that had not expired and that the essentiality analysis screened out non-relevant patents, thus creating a superior and more robust database of information [REDACTED].

Second, I showed that, to the degree that Dr. Leonard believes that LTE patents that were issued at the same time as or before 3GPP Release 8, the first release of LTE, are more necessary or more vital to LTE than are later patents, he is incorrect. The law and market forces require modern LTE devices to implement capabilities defined in releases later than Release 8.

Third, I responded to Dr. Leonard's [REDACTED]

[REDACTED] I showed that, in addition to the fact that common sense indicates that contributions analysis would be useful, (1) there is research and analysis that supports the use of contributions analysis, (2) one reference that Dr. Leonard cites in support of his view of contributions analysis contains a strong statement regarding the benefits of contributions analysis, and (3) careful reading of a second reference he cites in support of his view actually provides further support for contributions analysis. In addition to the review of such analysis I provide in my opening report, the discussion above further confirms my opinion that approved contribution analysis is a valuable tool for assessing SEP portfolio strength.


Charles L. Jackson

Port Tobacco, MD May 26, 2018